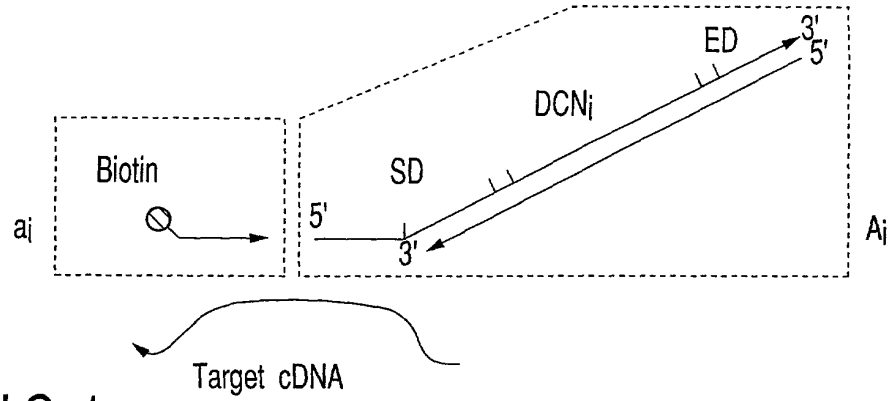


FIG. 1

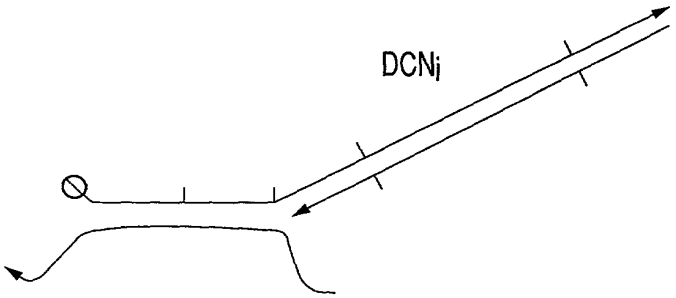


FIG. 2

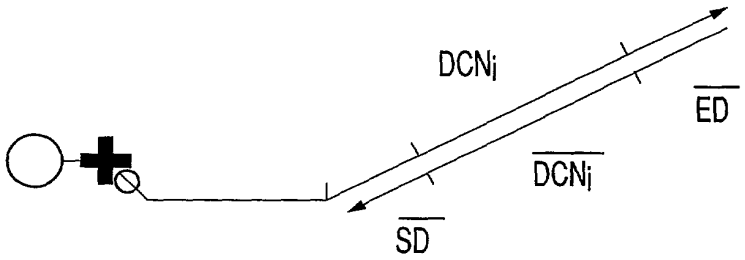


FIG. 3

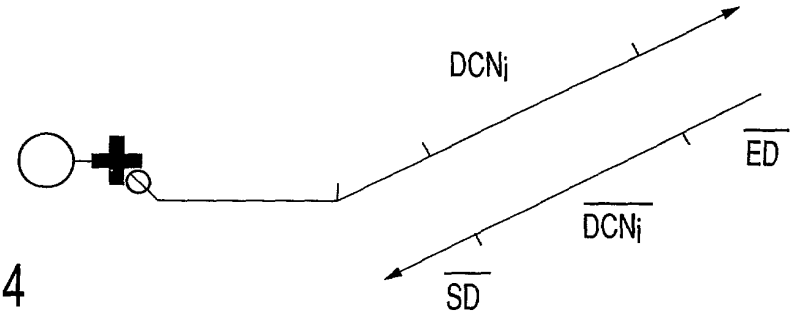


FIG. 4

FIG. 5

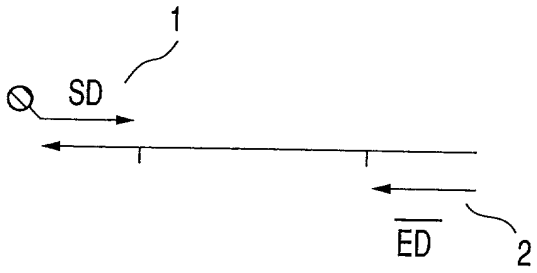


FIG. 6

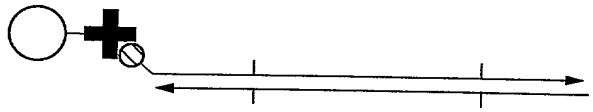


FIG. 7

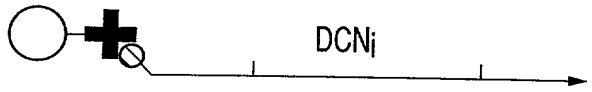


FIG. 8

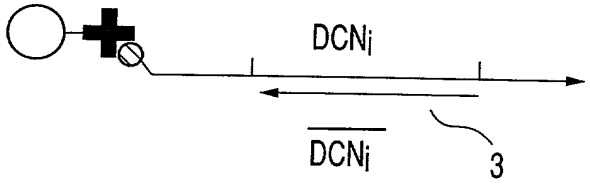


FIG. 9

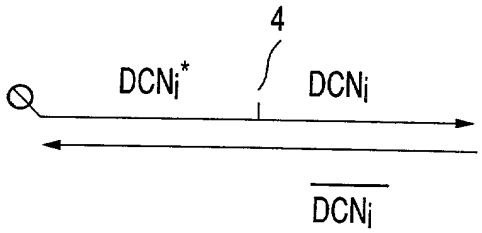


FIG. 10

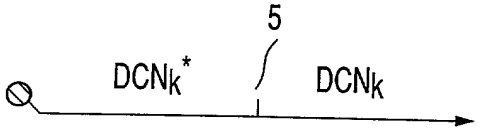


FIG. 11

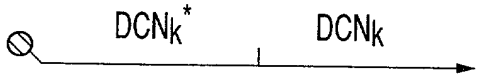
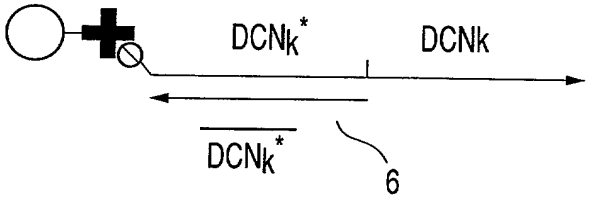


FIG. 12



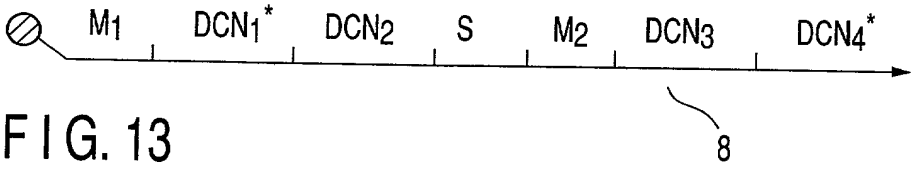


FIG. 13

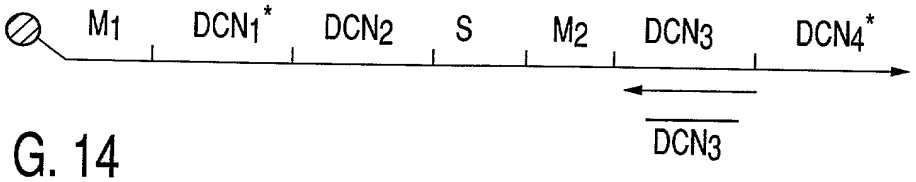


FIG. 14

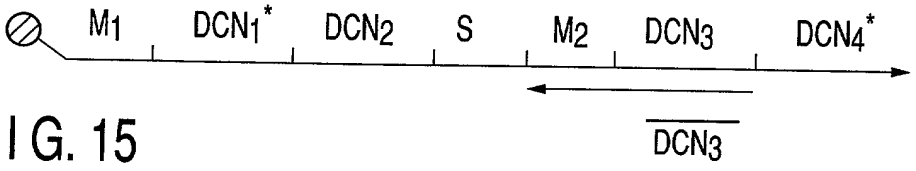


FIG. 15

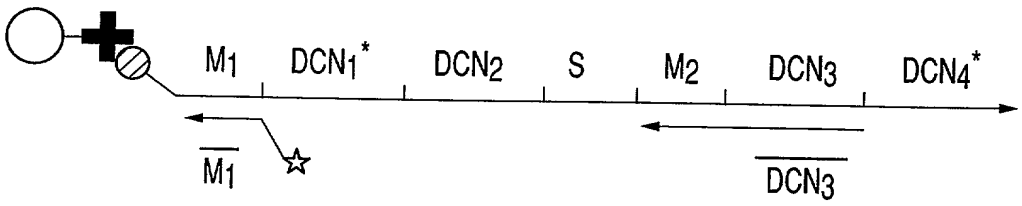


FIG. 16

FIG. 17

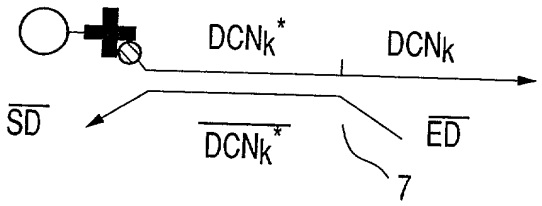


FIG. 18

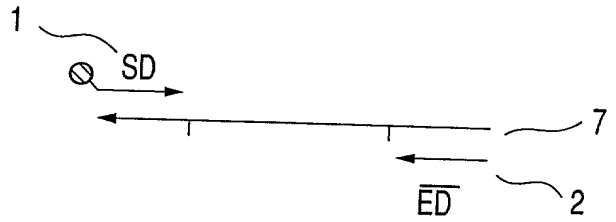


FIG. 19

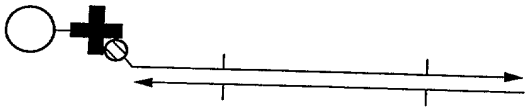


FIG. 20

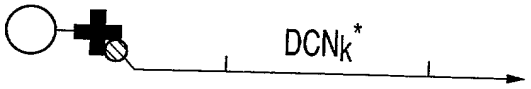
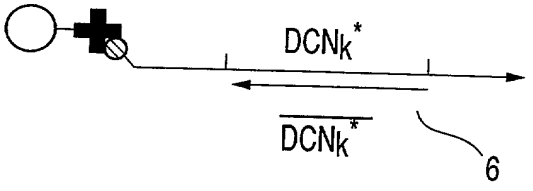


FIG. 21



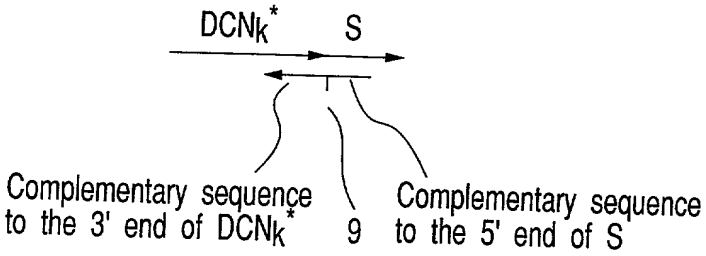
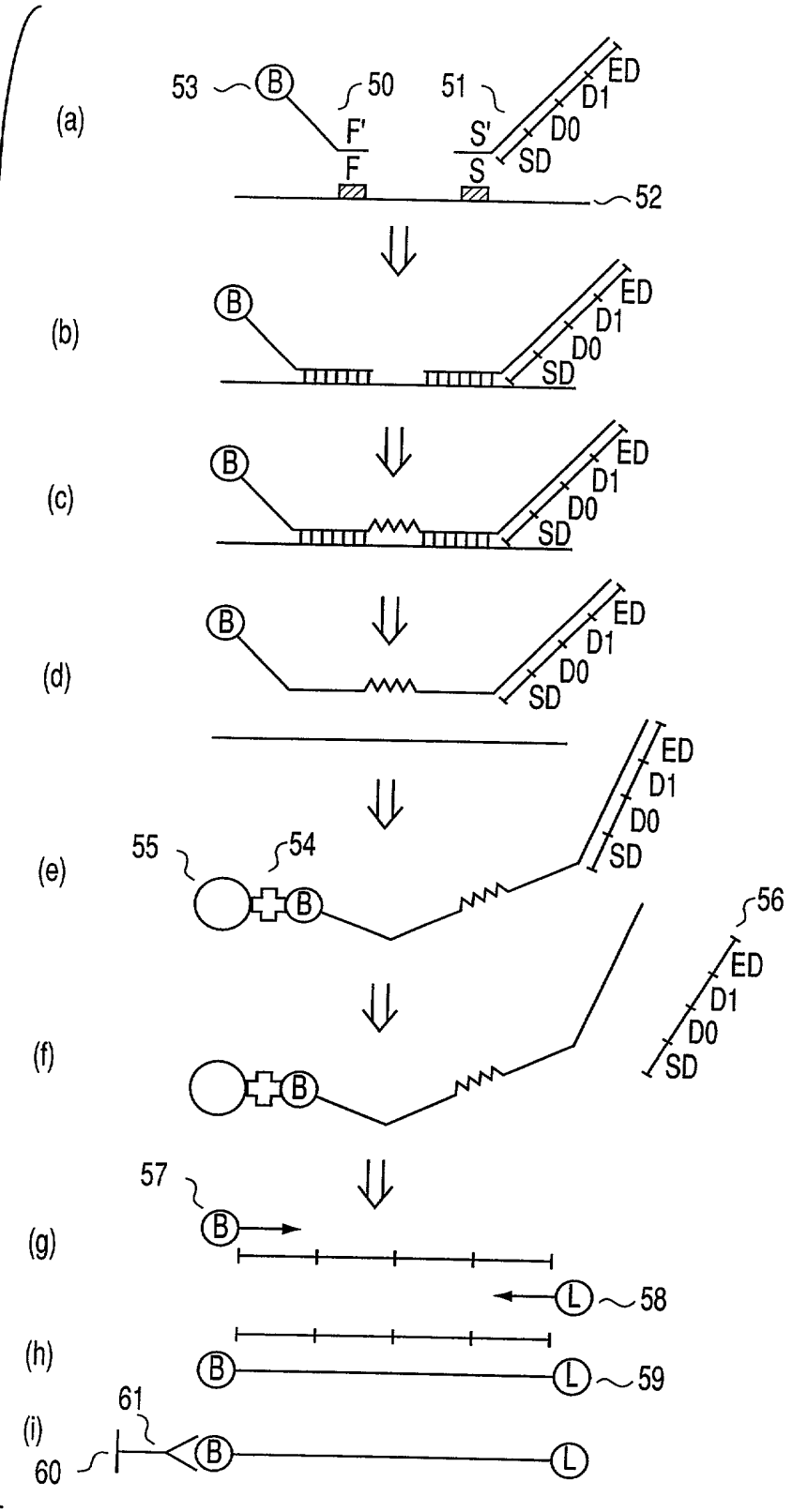


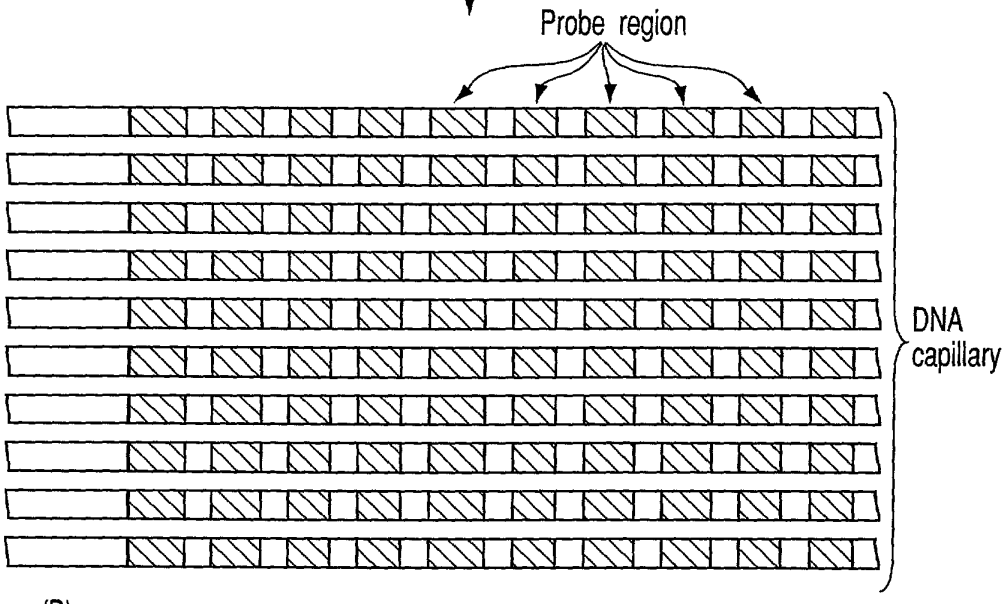
FIG. 22

FIG. 23



		D0									
		D0-1	D0-2	D0-3	D0-4	D0-5	D0-6	D0-7	D0-8	D0-9	D0-10
D1	D1-1	1									
	D1-2										
	D1-3										
	D1-4										
	D1-5										
	D1-6										
	D1-7										
	D1-8										
	D1-9										
	D1-10										

(A)



(B)

FIG. 24

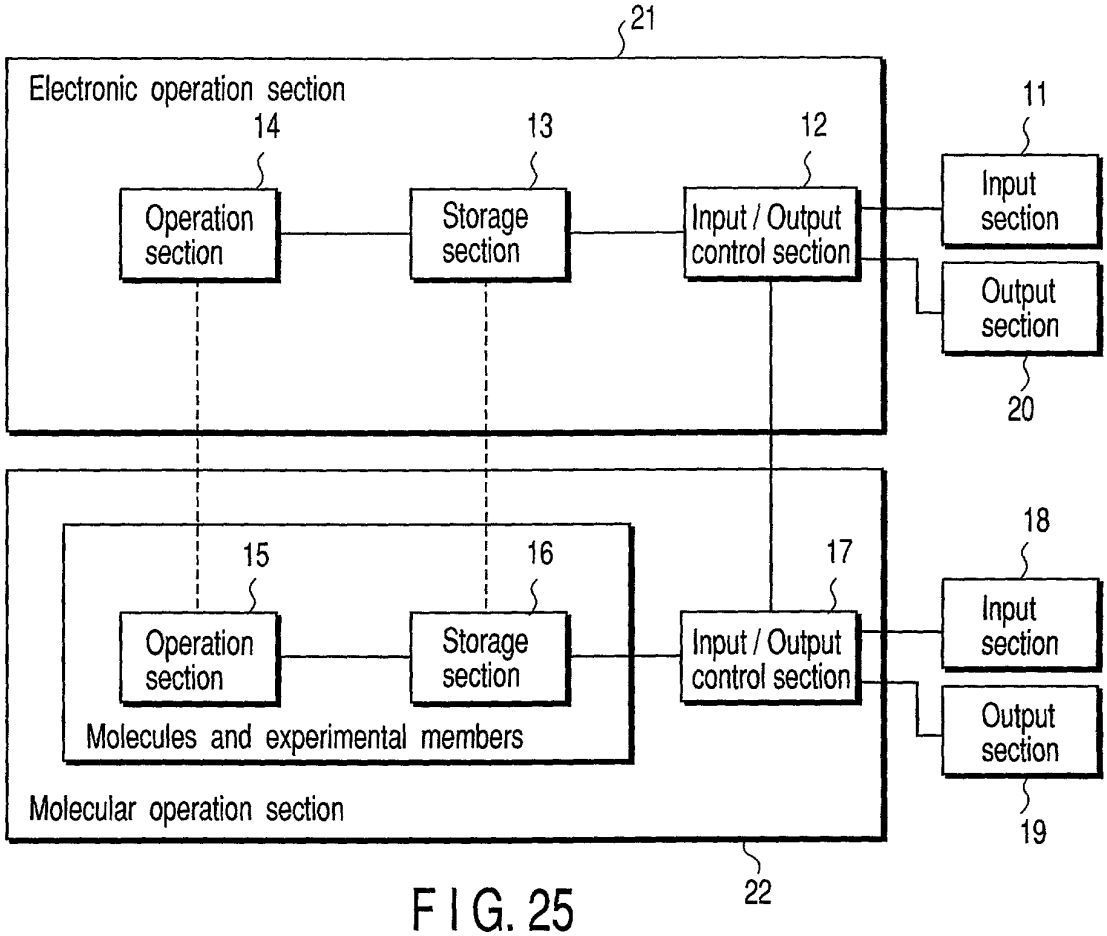

21
Electronic operation section
14
13
12
11
Operation section
Storage section
Input / Output control section
Input section
Output section
20
15
16
17
18
Operation section
Storage section
Input / Output control section
Input section
Output section
Molecules and experimental members
Molecular operation section
19
22

FIG. 25

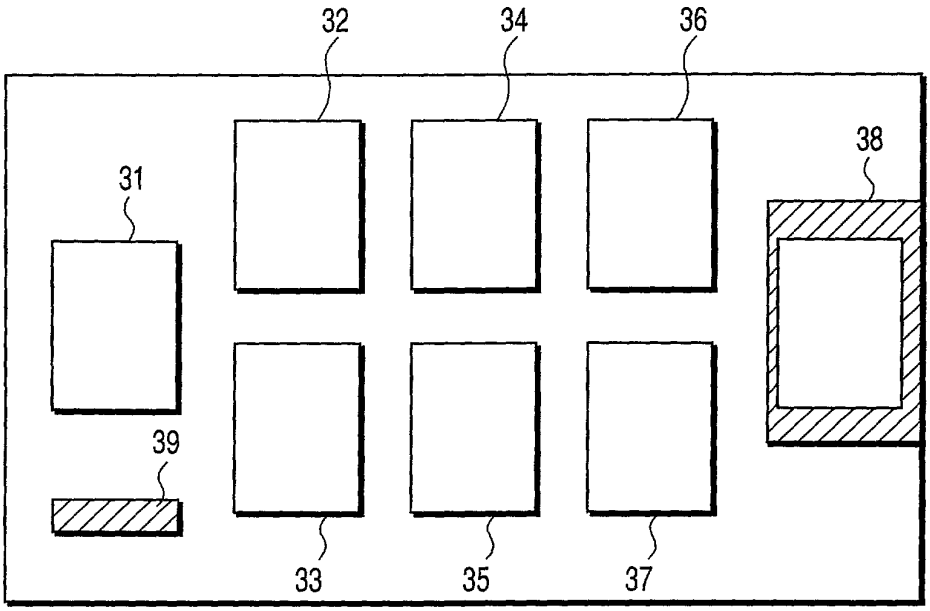

32
34
36
38
31
39
33
35
37

FIG. 28

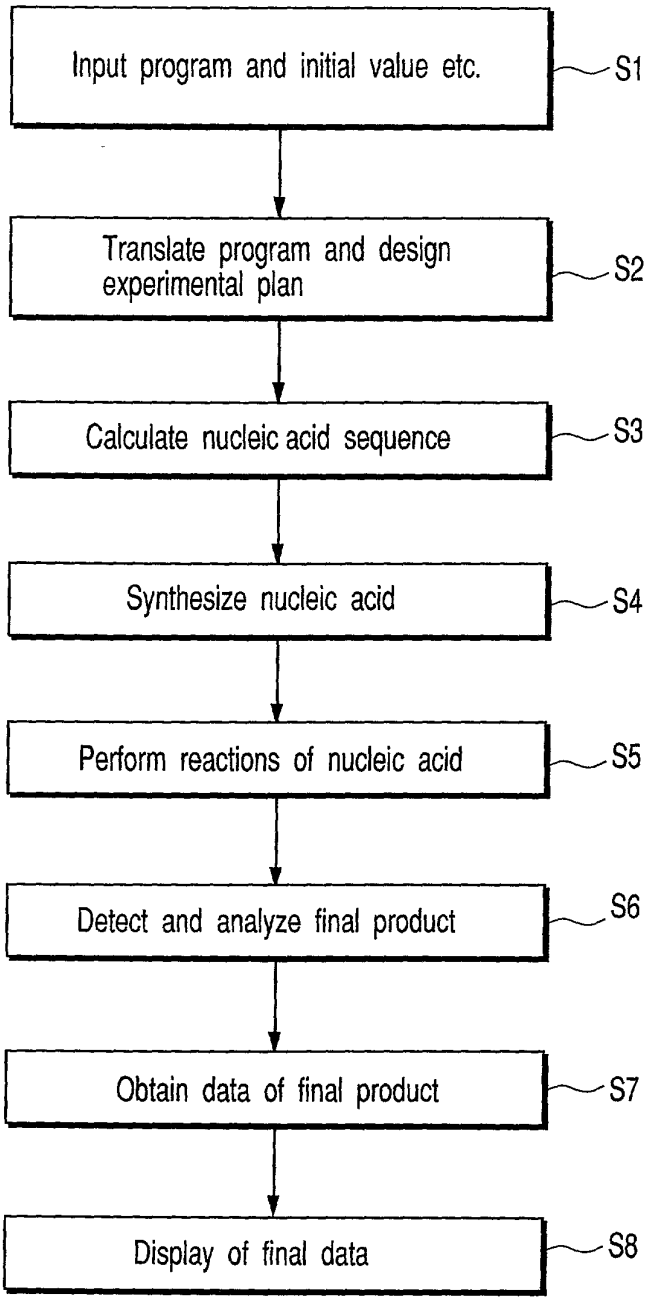

Input program and initial value etc.
S1
Translate program and design experimental plan
S2
Calculate nucleic acid sequence
S3
Synthesize nucleic acid
S4
Perform reactions of nucleic acid
S5
Detect and analyze final product
S6
Obtain data of final product
S7
Display of final data
S8

FIG. 26

Structure of device

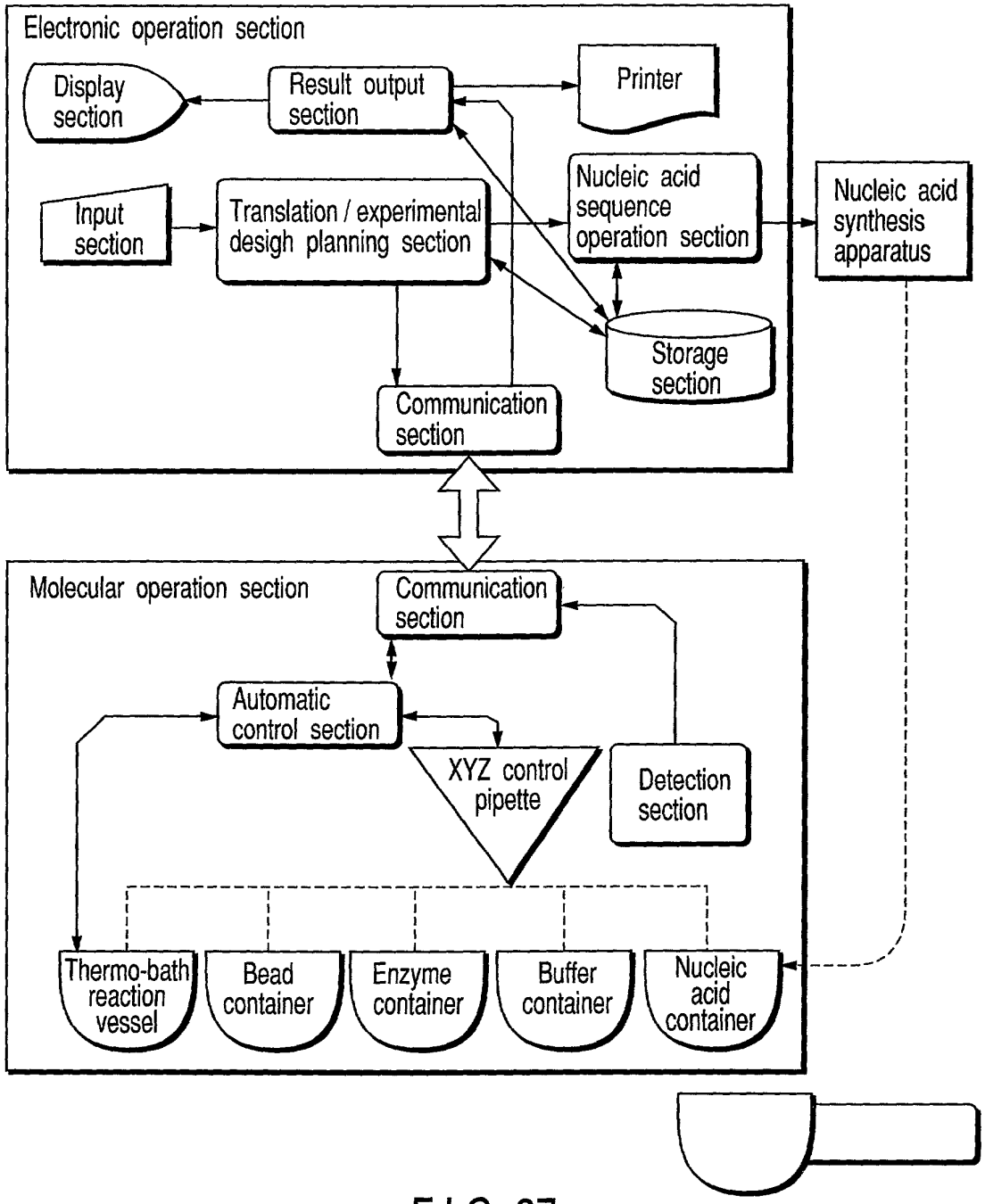


FIG. 27

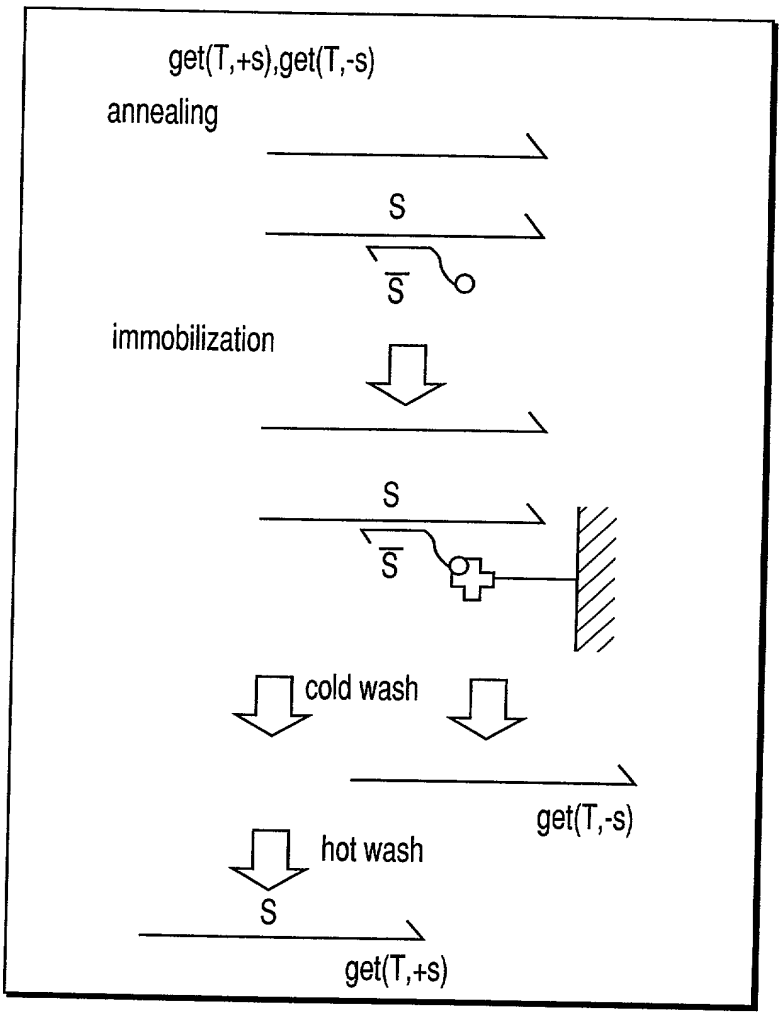

get(T,+s),get(T,-s)
annealing
S
S
immobilization
S
S
cold wash
get(T,-s)
hot wash
S
get(T,+s)

FIG. 29

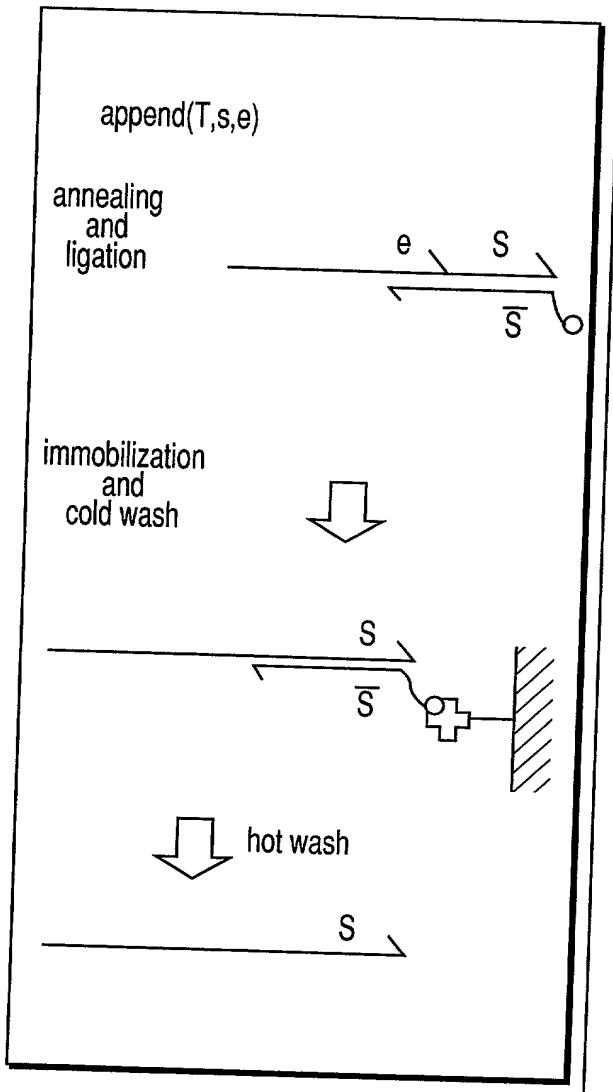

append(T,s,e)
annealing
and
ligation
e
S
S
immobilization
and
cold wash
S
S
hot wash
S

FIG. 30

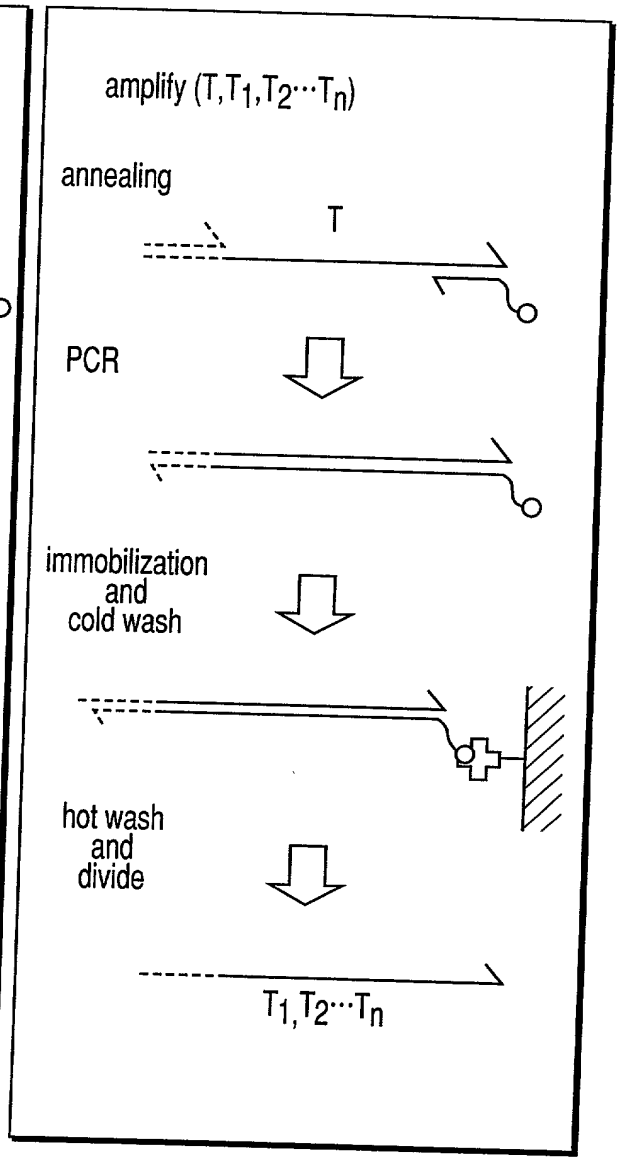

amplify (T,T1,T2···Tn)
annealing
T
PCR
immobilization
and
cold wash
hot wash
and
divide
T1,T2···Tn

FIG. 31

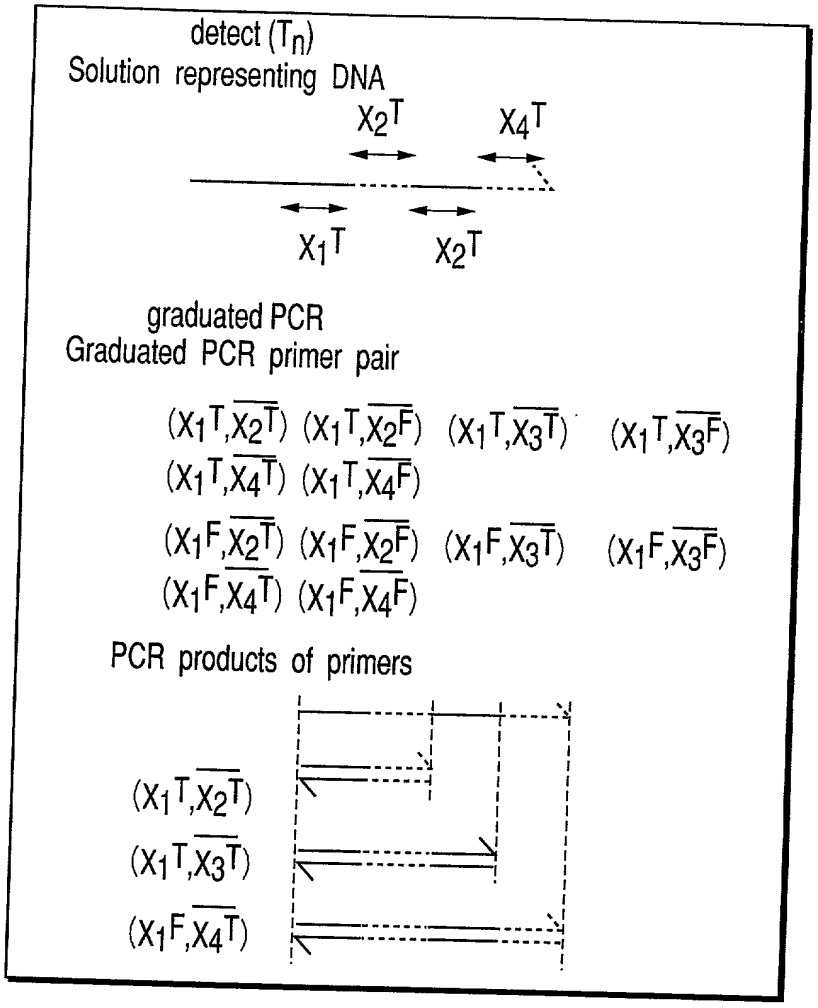

detect (T_n)
Solution representing DNA
X_2T
X_4T
X_1T
X_2T
graduated PCR
Graduated PCR primer pair
$(X_1T,\overline{X_2T})$ $(X_1T,\overline{X_2F})$ $(X_1T,\overline{X_3T})$ $(X_1T,\overline{X_3F})$
$(X_1T,\overline{X_4T})$ $(X_1T,\overline{X_4F})$
$(X_1F,\overline{X_2T})$ $(X_1F,\overline{X_2F})$ $(X_1F,\overline{X_3T})$ $(X_1F,\overline{X_3F})$
$(X_1F,\overline{X_4T})$ $(X_1F,\overline{X_4F})$
PCR products of primers
$(X_1T,\overline{X_2T})$
$(X_1T,\overline{X_3T})$
$(X_1F,\overline{X_4T})$

FIG. 32

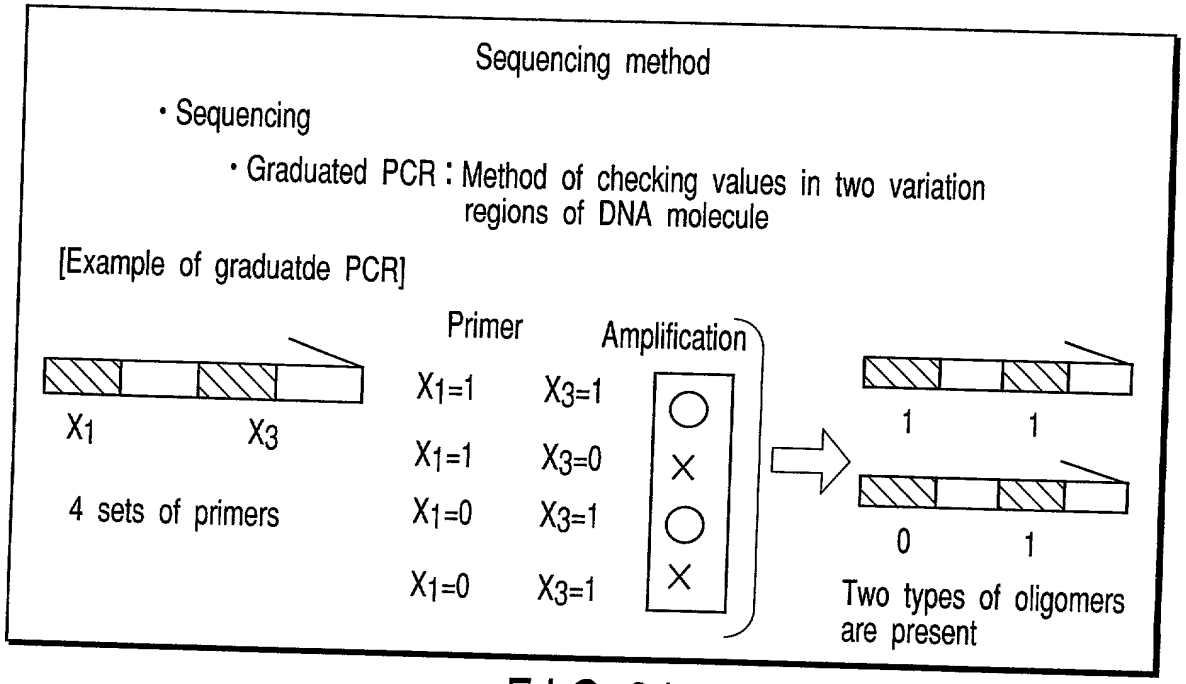

Sequencing method
• Sequencing
• Graduated PCR : Method of checking values in two variation regions of DNA molecule
[Example of graduatde PCR]
Primer
Amplification
X_1
X_3
4 sets of primers
$X_1=1$ $X_3=1$
$X_1=1$ $X_3=0$
$X_1=0$ $X_3=1$
$X_1=0$ $X_3=1$
1 1
0 1
Two types of oligomers are present

FIG. 34

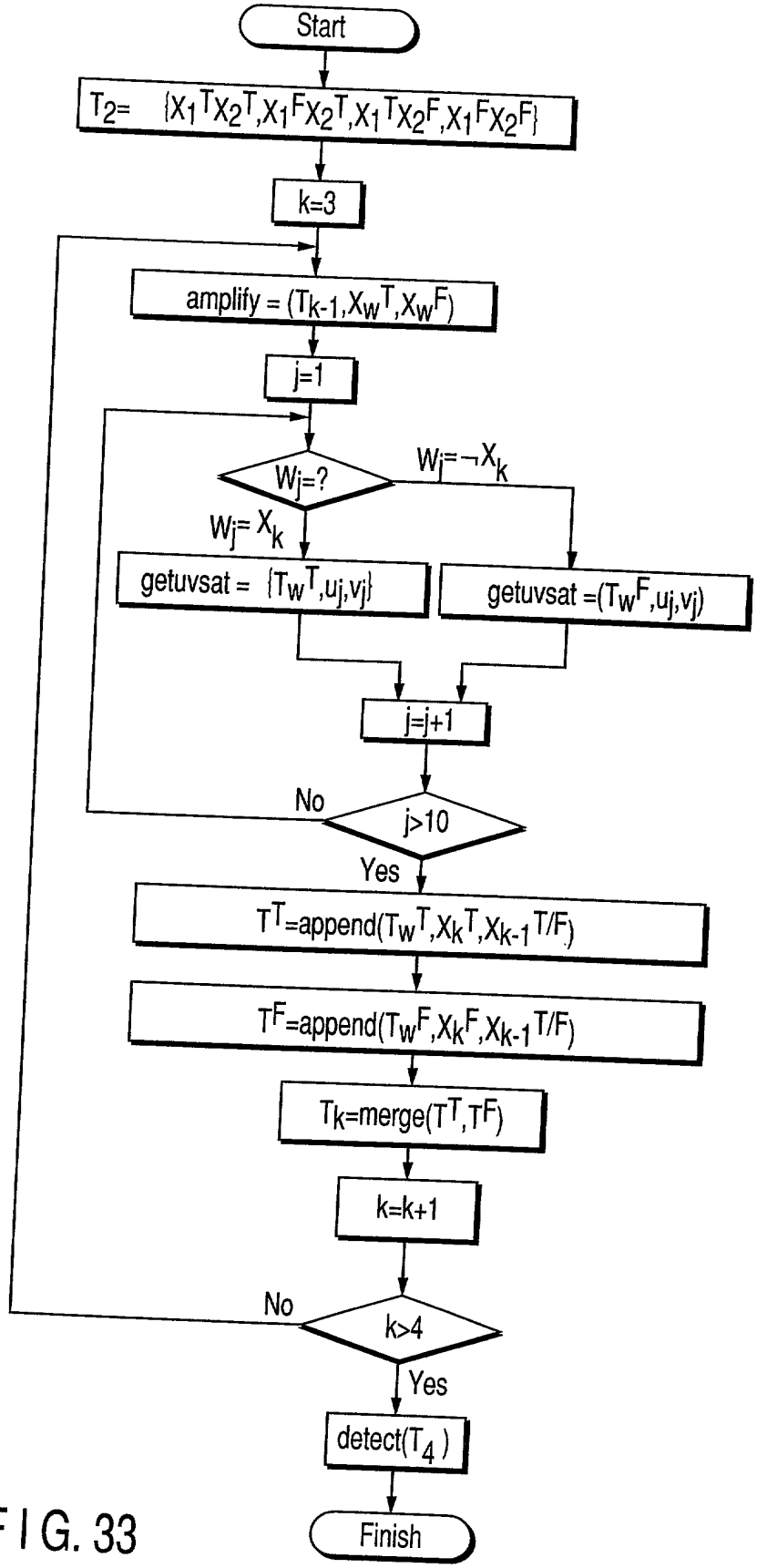

Start
T_2= {$X_1^T X_2^T$,$X_1^F X_2^T$,$X_1^T X_2^F$,$X_1^F X_2^F$}
k=3
amplify = (T_{k-1},X_w^T,X_w^F)
j=1
W_j=?
W_j=¬X_k
W_j= X_k
getuvsat = {T_w^T,uj,vj}
getuvsat =(T_w^F,uj,vj)
j=j+1
No
j>10
Yes
T^T=append(T_w^T,X_k^T,X_{k-1}T/F)
T^F=append(T_w^F,X_k^F,X_{k-1}T/F)
T_k=merge(T^T,T^F)
k=k+1
No
k>4
Yes
detect(T_4)
Finish

FIG. 33

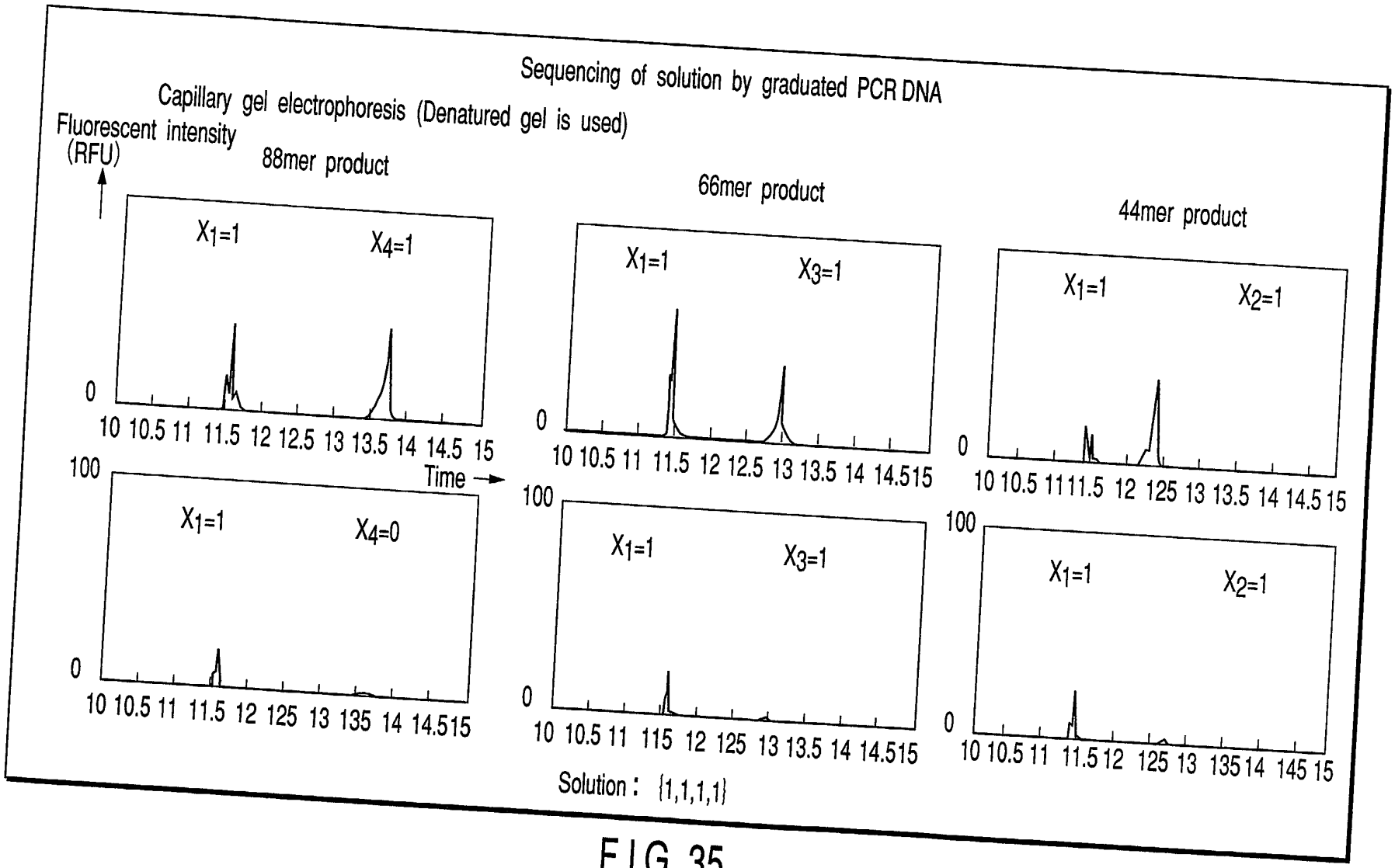

Sequencing of solution by graduated PCR DNA
Capillary gel electrophoresis (Denatured gel is used)
Fluorescent intensity
(RFU)
88mer product
66mer product
44mer product
X1=1
X4=1
X1=1
X3=1
X1=1
X2=1
0
10 10.5 11 11.5 12 12.5 13 13.5 14 14.5 15
100
Time
X1=1
X4=0
X1=1
X3=1
X1=1
X2=1
0
10 10.5 11 11.5 12 125 13 135 14 14.515
10 10.5 11 115 12 125 13 13.5 14 14.515
10 10.5 11 11.5 12 125 13 135 14 145 15
Solution : {1,1,1,1}

FIG. 35